• • • REMARKS/ARGUMENTS • • •

The Official Action of March 7, 2008 has been thoroughly studied. Accordingly, the following remarks are believed to be sufficient to place the application into condition for allowance.

By the present amendment independent claim 1 has been changed to recite the piston pump of a blood pressure measuring device. Claim 1 has further been amended to recite that the cylindrical cylinder has a cylinder head and that the cylinder and the cylinder head are bonded together by gluing, welding and/or adhesion in an air tight manner.

Dependent claim 2 has been amended to recite that the suction valve is arranged at a top face of the piston.

Dependent claim 3 has been amended to recite that the exhaust valve is umbrella-shaped and arranged at a top face of the top of the cylinder.

Dependent claim 4 has been amended to recite that the opening that communicates with the suction port is arranged outside the pump chamber and that the enclosure that encompasses the plenum is in a housing having a base portion that is fixed to the cylinder such that the base portion holds a motor.

Independent claim 5 has been amended to recite that the suction port is defined by a wall of the top portion of the cylinder, a side wall of the cylinder and a top face of the piston, and to further recite that the exhaust valve is umbrella-shaped and arranged outside the pump chamber.

Dependent claim 6 has been amended to recite that the suction valve is umbrella-shaped and arranged inside the pump chamber.

Dependents claim 7 has been amended to recite that the coupling member is ring-shaped.

Independent claim 13 has been amended to recite that the leakage inspection of the piston pump pre-assembly is conducted by pressurization.

Claims 12 and 14 have been canceled without prejudice or disclaimer.

New claims 15-18 have been added.

Entry of the changes to the claims is respectfully requested.

Claims 1-11, 13 and 15-18 are pending in this application.

On pages 2-3 of the Office Action the Examiner rejected claims 5 and 6 under 35 U.S.C. §112, first paragraph. Under this rejection the Examiner indicated that the previous recitation in claim 5 of the suction port arranged at the top "portion of the cylinder" contradicted claim 1 and the disclosure.

In response to this rejection, claim 5 has been amended to recite that the suction port is defined on a side of by a wall of the top portion of the cylinder, a side wall of the cylinder and a top face of the piston.

Claims 1-4, 7 and 8 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,188,519 to Spulgis in view of Japanese reference No. 2001-012354 to Ogawa.

Claims 5 and 6 stand rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 5,593,288 to Kikutani in view of Ogawa.

Claim 12 stands rejected under 35 U.S.C. §103(a) as being unpatentable or Spulgis.

Claim 9 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Spulgis and Ogawa in view of U.S. Patent No. 3,931,755 to Hatridge.

Claim 10 stands rejected under 35 U.S.C. §103(a) as being unpatentable over Spulgis and Ogawa in view of U.S. Patent No. 6,168,393 to Huber et al.

Claims 11 and 14 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Spulgis and Ogawa in view of U.S. Patent No. 4,343,314 to Sramek.

Claim 13 stands rejected under 35 U.S.C. §103(a) as being unpatentable over U.S. Patent No. 6,082,244 to Sigel et al. in view of U.S. Patent No. 5,848,879 to Hansson.

For the reasons set forth below, it is submitted that all of the pending claims are allowable over the prior art of record and therefore, each of the outstanding prior art rejections of the claims should properly be withdrawn.

Favorable reconsideration by the Examiner is earnestly solicited.

The Examiner has relied upon Spulgis as teaching:

> ...a piston pump (14) reciprocating inside the cylinder; a suction port (See Fig. 1, top of piston) through which gas sucked into a pump chamber defined by the cylinder (12) and the piston (14) passes; and an exhaust port (52) through which the gas discharged from the pump chamber (20) passes; wherein the piston sucks the gas through the suction port and discharges the gas through the exhaust port (52) as the volume of the pump chamber is changed by reciprocating motion of the piston; wherein the suction port is arranged at a top of the piston with a suction valve (24), which opens as the volume of the pump chamber is increased; and wherein the exhaust port (52) is arranged at a top pf the cylinder with an exhaust valve (60), which opens when the volume of the pump chamber decreases.

The Examiner concedes that:

Spulgis (saturated fluid pump) fails to gas as the material being compressed and pumped by the pump apparatus...

The Examiner has taken the position that:

It would have been obvious...to modify the Spulgis apparatus by means of Ogawa to achieve improvement n the cooling efficiency of the piston chamber, hence, extending the life of the piston.

Spulgis discloses an apparatus for pumping liquids, in particular, saturated or near saturated liquids, for example, cryogenic liquids such as hydrogen (boiling point: -252.9 degree Celsius), oxygen (boiling point: -183.0 degree Celsius), nitrogen (boiling point: -195.8 degree Celsius), and methane (boiling point: -161.49 degree Celsius) (column 1, lines 5-8, lines 15-26).

Accordingly, the pump of Spulgis is specifically configured and designed to handle liquids at extremely low temperatures, in which most organic material (including adhesives) would be frozen and lose flexibility and mechanical strength. Further, under such extreme conditions an ordinary pump would not work well due to nonfunctional lubricant in friction parts and mechanisms.

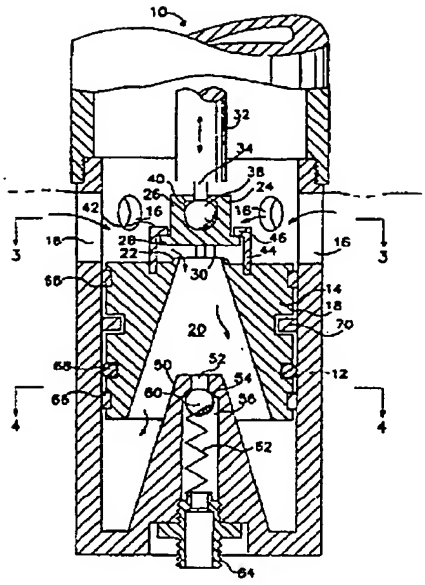
Although Spulgis and the present application relate to the piston pump, the technology required in Spulgis is significantly different from that of the present application. In particular, the cylinder and the cylinder head of Spulgis are necessarily made of one body and the material used is a metal chosen in consideration of the low temperature environment.

Moreover, the invention of Spulgis is a reciprocating pump which is specifically designed to substantially eliminate cavitation problems without imposing capacity and flow limitations to maintain

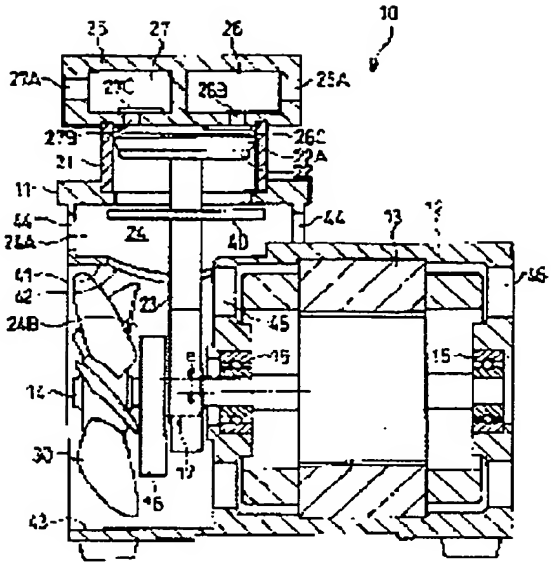
a net positive suction head (column 1, lines 60-63). It is an express and critical object of Spulgis to eliminate any cavitation, which implies no gas should be handled by, or present in, the pump during operation.

Since the pump of Spulgis is specifically configured and designed to handle liquid, and not vapors or gases as in the case of the pump of the present invention, it would not have been obvious to combine any other pumps with, or modify Spulgis so as to handle air or vapor.

In more detail, Spulgis discloses a positive displacement reciprocating pump 10 comprising a cylinder 12 and reciprocating piston 14. A plurality of inlet openings 16 are evenly spaced around the upper circumference of the cylinder 12 to allow the liquid to flow into the cylinder above the piston 14. The piston 14 is a cylindrical block 18 having a hollow frusto-conical bore 20 oriented with its base at the bottom of the block 18 and tapering to open at the top where the block 18 is raised in a circular boss 22 to provide a sealing seat for an inlet valve means 24. The valve means 24 comprises a cylindrical stem 26 with a circumferential disk 28 at its base to provide a flat sealing face 30 which, when seated against the boss 22, closes the conical bore 20 to liquid passage. The stem 26 is coupled to a push rod 32 by a ball coupling comprising a short rod extension 34 terminating in a ball 38. The stem 26 has a hollow chamber 40 with hemispherical bottom sides conforming to the dimensions of the ball 38, and an opening through which the rod extension 34 passes to connect to the push rod 32. The stem 26 and disk 28 are thus permitted to swivel around the ball 38 to seek a flat seating of its sealing face 30 against the boss 22. See Fig. 1 of Spulgis below:



Ogawa discloses a pump in which a piston 22 is reciprocated in a cylinder 21 through an eccentric member 17 and a connecting rod 23 by the rotation of its drive shaft 14. An axial fan 30 is connected to the drive shaft 14 of the motor 13, and the outside air is taken into a piston chamber 24 by the rotation of the axial fan 30 and further fed to the motor 13 side, whereby the cooling of the piston chamber 24 and the motor 13 is performed (Abstract). See Fig. 1 of Ogawa below:



It is apparent that the pump of Ogawa handles air or other gas at around room temperature.

Thus, Spulgis and Ogawa are not sufficiently related so that the particular technologies of each do not apply to the other.

Thus, it would not have been obvious to combine Spulgis and Ogawa since their particular technologies and goals are not necessarily common.

Moreover, even if Spulgis and Ogawa were properly combinable, the features of claim 1 would still not be fully disclosed.

For example, neither Spulgis nor Ogawa discloses that the cylinder and the cylinder head are bonded by gluing, welding, and/or adhesion in an air tight manner. Further, neither Spulgis nor

Ogawa discloses a suction port with a valve at a top of the cylinder and an exhaust port with a valve at a top of the piston.

It is noted that the Examiner's basis (support) for combining the teachings of Spulgis and Ogawa are:

> ...to achieve improvement n the cooling efficiency of the piston chamber, hence, extending the life of the piston.

Certainly, there is no reason to modify Spulgis as taught by Ogawa to provide a fan to "improve the cooling efficiency" inasmuch as Spulgis teaches pumping saturated liquids such as hydrogen (boiling point: -252.9 degree Celsius), oxygen (boiling point: -183.0 degree Celsius), nitrogen (boiling point: -195.8 degree Celsius), and methane (boiling point: -161.49 degree Celsius).

The Examiner's basis for combining Spulgis and Ogawa is therefore unfounded.

The Examiner has relied upon Kikutani as teaching:

> ..a piston pump including a cylindrical cylinder (21) having a top portion; a piston (22) reciprocating inside the cylinder (21); a suction port (34) through which gas sucked into a pump chamber (40) define on a side of the top portion of the cylinder (21) by the cylinder (21) and piston (22) passes; and an exhaust port (52) through which the gas discharged from the pump chamber passes; wherein the piston pump sucks the gas from the suction port and discharges the gas through the exhaust port (52) as a volume of the pump chamber is changed by reciprocating motion of the piston (22); wherein the suction port is arranged at the top portion of the cylinder (21) with a suction valve (36), which opens when the volume of the pump chamber is increased; and the exhaust port (52) is arranged at the piston (22) with an exhaust valve (53), which opens when the volume of the pump chamber is decreased. (See Abstract).

The Examiner concedes that:

> ...Kikutani fails to teach gas as the element to be compressed in the pump which is taught by Ogawa.

Kikutani is quite similar to Spulgis in that Kikutani is concerned with pumping a liquefied gas. In particular, Kikutani is concerned with providing a liquefied gas pump which can drive out bubbles generated in the pump chamber due to cavitation.

Thus, for similar reasons argued above the teachings of Kikutani and Ogawa are not properly combinable as the Examiner purports.

Further, the Examiner's basis for combining the teachings of Kikutani and Ogawa, i.e. to "achieve improvement in the cooling efficiency of the piston chamber" is unfounded.

The Examiner has relied upon Hatridge as teachings the use of a self-lubricating material in a pump.

The Examiner's further reliance upon Hatridge does not address or overcome the distinctions between Spulgis and Ogawa.

The Examiner has relied upon Huber as teaching a piston pump that includes a motor and a housing for the motor.

The Examiner's further reliance upon Huber does not address or overcome the distinctions between Spulgis and Ogawa.

Moreover, Huber teaches a motor-driven radial pump piston pump which is a rotary-type pump. There is no reciprocating movement in the pump of Huber.

The Examiner has relied upon Sramek as teaching a blood pressure monitor.

The Examiner's further reliance upon Huber does not address or overcome the distinctions between Spulgis and Ogawa.

The Examiner has relied upon Sigel as teaching:

> ...a method of producing a piston pump (10) including a cylindrical cylinder (14), a piston (20) reciprocating inside the cylinder; a suction port (38) through which gas is sucked into a pump chamber defined by the cylinder and the piston passes and an exhaust port (64) through which the gas discharged from the pump chamber passes; the method comprising the steps of: producing a piston pump pre-assembly comprising the cylinder and a cylinder top portion in which the exhaust port is formed; (Column 5, lines 5-18) producing a piston pump by further assembling components to the piston pump pre-assembly (Column 5, lines 5-12).

The Examiner concedes that: Sigel fails to teach conducting a leakage inspection of the piston pump pre-assembly.

The Examiner takes the position that:

> It would have been obvious....to incorporate the method of inspecting fluid leakage from the piston apparatus disclosed by Hansson in the piston producing method of Sigel to achieve a more reliable and leakage free system by doing prior inspection of the piston to identify and eliminate leakage.

Independent claim 13 has been amended to recite that the leakage inspection of the piston pump pre-assembly is conducted by pressurization.

Neither Sigel nor Hansson disclose a pressurized leakage test/inspection.

Hansson merely provides for visual inspection of leaking hydraulic fluid by providing cylinder bores that open out into the outside of the block at easily reached locations, whereby the locations may also be exposed so as to be readily seen foe inspection purposes. (See column 3, lines 47-55).

There is no teaching or benefit for pressurization testing/inspection in Hansson.

Based upon the above distinctions between the prior art relied upon by the Examiner and the present invention, and the overall teachings of prior art, properly considered as a whole, it is respectfully submitted that the Examiner cannot rely upon the prior art as required under 35 U.S.C. §103 to establish a *prima facie* case of obviousness of applicants' claimed invention.

It is, therefore, submitted that any reliance upon prior art would be improper inasmuch as the prior art does not remotely anticipate, teach, suggest or render obvious the present invention.

It is submitted that the claims, as now amended, and the discussion contained herein clearly show that the claimed invention is novel and neither anticipated nor obvious over the teachings of the prior art and the outstanding rejection of the claims should hence be withdrawn.

Therefore, reconsideration and withdrawal of the outstanding rejection of the claims and an early allowance of the claims is believed to be in order.

It is believed that the above represents a complete response to the Official Action and reconsideration is requested.

If upon consideration of the above, the Examiner should feel that there remains outstanding issues in the present application that could be resolved, the Examiner is invited to contact applicants' patent counsel at the telephone number given below to discuss such issues.

To the extent necessary, a petition for an extension of time under 37 CFR §1.136 is hereby made. Please charge the fees due in connection with the filing of this paper, including extension of time fees, to Deposit Account No. 12-2136 and please credit any excess fees to such deposit account.

Respectfully submitted,

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